Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50468

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Eighth Semester
Electrical and Electronics Engineering
EE 6010 : HIGH VOLTAGE DIRECT CURRENT TRANSMISSION
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. Classify HVDC links.
2. Why is bipolar DC link most commonly used ?
3. Why the three-phase bridge circuit is invariably used for conversion and inversion in HVDC system ?
4. What is the effect of source reactance on converter without AC filters ?
5. Give the start-up procedure of a DC link with long-pulse firing.
6. State why feedback control of power in a DC link is not desirable ?
7. Distinguish between characteristics and non-characteristic harmonics.
8. How the effectiveness of the DC filter is judged in HVDC system ?
9. What are the four basic variables in a converter are used for dc load flow solution ?
10. Give the procedure of dc load flow solution.

PART – B **(5×16=80 Marks)**

11. a) Give a comparison between HVDC system with EHVAC system based on economics, technical performance and reliability when bulk power is transmitted over a long distance. **(16)**

(OR)

b) i) Briefly discuss about the various considerations in planning for HVDC system depends on the application. **(8)**

ii) What is the necessity of circuit breakers in HVDC system ? Discuss the operaton of any one type of HVDC circuit breakers. **(8)**

12. a) With neat sketches, describe the individual characteristics of a converter bridge when operating as a i) rectifier and ii) inverter. **(16)**

(OR)

b) Explain the method for obtaining steady state solution of equations for a six-pulse HVDC converter bridge with filters. **(16)**

13. a) Describe the two basic firing angle control schemes adopted for HVDC system with neat sketches. Also discuss the merits and demerits of each scheme. **(16)**

(OR)

b) Explain in detail the converter control characteristics of HVDC system. **(16)**

14. a) i) What are the causes of non-characteristics harmonics ? And explain in detail. **(8)**

ii) Give the design aspects of single tuned filter. **(8)**

(OR)

b) Explain the concept of reactive power requirement in a HVDC converter and discuss how they are affected by the converter control methods with its characteristics ? **(16)**

15. a) Derive the mathematical modeling model of a DC network, DC converter and its controllers in the power flow analysis. **(16)**

(OR)

b) i) Explain the per unit system for DC quantities. **(6)**

ii) With detailed flowchart, explain the procedure of simultaneous and sequential methods of AC-DC power flow analysis. **(10)**